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TWO CASES OF PHTHISIS TREATED BY INTRA-PULMONARY INJECTIONS.[1]

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THE surgical treatment of lung cavities in phthisis by free incision of the chest-wall was, according to Pepper, suggested as far back as 1696 by Baglivi, and has since been resorted to occasionally, but it is only within a comparatively short period that injections of antiseptic substances through the chest-wall by means of an aspirating needle attached to a syringe have been resorted to.

In 1873 F. Mosler, of Greifswald, first reported two cases of phthisis in which he injected a weak solution of permanganate of potash into lung cavities without the slightest discomfort to the patient, and with subsequent improvement in many of the symptoms.

Since then various experiments have been made on both sides of the Atlantic, and the almost universal verdict is in favor of the operation as innocuous when carefully done, and as a means of greatly ameliorating many of the most distressing symptoms of the disease, even when no permanent cure has been effected.

[1] Read before the Section for Clinical Medicine, Pathology, and Hygiene of the Massachusetts Medical Society (Suffolk), March 13, 1889.

In looking over the literature of the subject, the names of Mosler,[2] Rosenbusch[3] in Germany, Shingleton Smith,[4] Godlee,[5] and T. Sinclair [6] in Great Britain, Gougenheim [7] of Paris, and Wm. Pepper,[8] Beverly Robinson,[9] and John Blake White [10] in this country, appear most prominently.

In 1874 Pepper in two exhaustive papers published the results of a number of cases; a few years later Beverly Robinson gave another series of cases, and in 1886 John Blake White first speaks with enthusiasm of the same treatment in several patients under his care. The verdict of these three gentlemen being, while differing possibly in minor details, that the operation is one which can be resorted to with perfect safety, and is of the greatest service in many cases.

The usual substances injected have been either solutions of bichloride of mercury ($\frac{1}{2000}$, $\frac{1}{1000}$, and $\frac{1}{500}$) as suggested by Gougenheim, a mixture of camphor and carbolic acid as used by Shingleton Smith, iodine in the form of "Lugol's solution," or a mixture, the chief ingredients of which are iodine and

2 Mosler, F. Berliner klinische Wochenschrift, 1873, No. 43.
3 Rosenbusch, L. Wiener med. Presse, 1888, vol. xxix. pp. 87 and 865.
4 Smith, R. Shingleton. Bristol Med.-Chir. Journal, October, 1888, vi. p. 185; do., September, 1885; London Practitioner, v. 42, p. 52; v. 38, p. 137; Transacts. Internat. Med. Congress, 1887, p. 195.
5 Godlee, J. R. Lancet, 1887. i. pp. 457, 511, 666, 714.
6 Sinclair, T. Dublin J. M. Soc., 1887, 3 s. lxxxiii. p. 497.
7 Gougenheim. Bull. et mem. Soc. méd. d. hop. de Par., 1886, 3 s. iii. 9-16.
8 Pepper, Wm. American Jour. Med. Sciences, July and October, 1874; Transacts. Am. Med. Assoc., 1880.
9 Robinson, B. Phila. Med. Times, November, 1884; N.Y. Med. Record, 1885, v. xxvii. p. 29; N. Y. Med. Journ., 1885, v. xlii. p. 533.
10 White, John Blake. N. Y. Med. Record, 1886, v. xxix. and xxx. pp. 593 and 536; Phila. Med. Times, 1886-87, xvii. p. 263; S. California Practitioner, 1887, ii. p. 208.

carbolic acid, as suggested by John Blake White, whose formula I have used in the cases I am about to report.

So far as I know there are no reported cases in which this operation has been performed in our immediate vicinity, and through the courtesy of Dr. Bullard, who took charge of the first patient for whom I advocated this treatment, I have the pleasure of giving some striking results obtained in two cases occurring in our service at the Carney Hospital.

Case I. D. L., man, twenty-four; single; waiter in hotel. Entered Carney Hospital January 12, 1888. Father and mother both died of phthisis when patient was a child. Two brothers living and well. Patient usually well. Malaria six or seven years before entrance. No syphilitic nor rheumatic history. Habits fairly good.

Four weeks before entrance noticed pain in the right back. Cough began about the same time with slight amount of dark-colored, sticky, apparently odorless sputa. No blood. Feverishness at night. Cough increased; sputa became thick, yellow, and scanty. Occasional night sweats. No dyspnœa nor palpitation. No marked loss of flesh or strength. Loss of sleep; constipation. No special loss of appetite. Lying on left side caused cough. At time of entrance patient was rather pallid and thin, with dark circles under the eyes. The breath had a distinctly gangrenous odor, noticeable several feet from the bed; likewise the sputa, which was greenish. Cough very troublesome. Slight flat-

tening in the right infra-clavicular space. No special dulness, but a few very obscure moist râles heard in this region. None elsewhere. Respiration throughout rather faint but good. Urine at first normal. Later, contained $\frac{1}{8}\%$ albumen which soon disappeared.

℞ Liquor sodæ chlorinatæ, gtt. ij t.d. and a cough syrup.

January 23 (eleven days later). Slight improvement. After cough one-third of a cupful of thin, very fetid sputa was raised. Night sweat.

Percussion slightly higher pitched in right upper front and back with obscure crumpling. Breath very fetid, especially after cough.

℞ Atropiæ sulph. gr. $\frac{1}{60}$ at night. Liquor sodæ chlorinatæ increased to minims 15 t.d.

February 12 (one month after entrance). Patient losing ground rapidly. Cough troublesome. Breath at times very gangrenous.

Dr. Bullard, who then came on duty, recorded "diminished resonance in right front to level of nipple. Elsewhere normal. High-pitched breathing in right supra-clavicular space. From lower margin of first rib to second interspace on the right, respiration is bronchial from edge of sternum to one and one-half inches outwards. Expiratory murmur prolonged down to the fourth rib and to axillary line. Numerous coarse râles all over right front. Few subcrepitant râles in right supra-spinous fossa. Occasional râle in right back below. Elsewhere normal."

February 20. An examination of the sputa then and several times afterwards by the hospital pathologist, Dr. E. K. Dunham, showed no bacilli. Patient slightly better. Odor not quite so perceptible after using a vapor of phenyle in an Oliver inhaler. Cough still very troublesome.

March 4 (two months after entrance). After consultation it was decided to try an injection of "carbolized-iodine" into the lung, and fifteen minims of the following solution were injected by Dr. Bullard into the right apex, the needle of the syringe having been inserted in the second intercostal space, half-way between the mammillary and anterior axillary lines and pressed in to the depth of one and one-half to two inches: —

℞ Atropiæ sulph. gr. ½; morphiæ sulph. gr. 2; tinct. iodi ʒ 3; acid. carbol., gtt. 20; glycerine ʒiss; spts. vini rect. (*dil.* 20–30 %) ʒiss.

No great pain nor discomfort except slight coughing was noticed. The odor of iodine was noticed immediately in the breath.

March 5. Patient felt better than any time before for two weeks. No pain; cough and expectoration decidedly less; odor greatly lessened.

March 6 (two days after operation). Odor wholly gone. Patient very comfortable. Unfortunately no physical examination is recorded at this time, although it was doubtless made.

March 11 (one week after first injection). As a slight fetor was again noticed a second injection was made in the same place without any uncomfortable symptoms.

March 21 (seventeen days after first and ten days after second injection). "Only a few subcrepitant râles can be heard in right supra-spinous fossa. Tickling in throat caused slight cough occasionally. Decided improvement in general condition. Up and about ward every day."

April 23 (one month and twelve days after second operation). "Patient gaining flesh. Some enlarged glands in left groin opened; escape of thin purulent fluid. Patient feeling nicely. Slight cough at night from tickling in throat."

May 16. Dr. Hugh Ferguson being on duty at the hospital, makes the following record:—

"Patient has gained much in flesh and strength. Slight diarrhœa lately. Occasional slight fetor of breath. Cough has increased. Obscure râles in second right interspace with slight dulness." A tonic of the citrate of iron and quinine was given about this time.

May 25 (two and one-half months after second injection). "Fetor of breath and cough have increased. Dulness, râles, and bronchial breathing in right second interspace with increased vocal fremitus. Râles all over right back."

The lung was again injected as before. Speedy relief from the odor. Cough and expectoration greatly diminished. Appetite improved.

Three days later slight fetor noticed by patient, the first since the injection.

June 1. Right lung again injected by Dr. Ferguson. Patient rapidly improved.

From this time there was a steady gain of strength and flesh (fifteen pounds in two weeks). The odor and tickling in throat disappeared entirely.

June 26 (five months and a half after entrance.) "No râles found in chest. Respiratory murmur somewhat tubular over site of cavity in right second interspace but otherwise nothing abnormal can be detected in chest."

Patient was discharged from the hospital feeling strong and well, and at my advice took a position in a hotel in Martha's Vineyard where he would get plenty of out-door exercise and not very hard work. Just after leaving the hospital he expectorated a slight amount of bloody sputa,but his cough entirely disappeared after this and he remained out of the city until the middle of September, when he resumed work here in a hotel. Unfortunately, in October, he for a short time got into rather dissolute habits, and on the 28th of November, when I next saw him, he showed the effects of his dissipation somewhat, but had had no cough since leaving the hospital, and was plump and apparently healthy. Physical examination showed slightly less percussion note in right apex. No definite râle heard anywhere except possibly an occasional faint dry click over seat of former trouble, and respiration was slightly tubular there and somewhat dull in the middle of right back, but no râle heard. Left lung free. A second examination a week or two later gave the same results.

December 27. Seen with Dr. Bullard. Patient

stated that three days previously he noticed a slight cough with feverishness. Upon examination in the upper left back after cough, near the vertebral column a fine crepitation was noticed; no bronchial breathing; no change of voice. Temp. 102.4°; pulse 104.

He was told to leave work for a few days, and if not better to enter the hospital again, which he did very soon after, during my service. Since that time the patient has developed all the symptoms of pulmonary tuberculosis in the left lung. At different examinations marked and rapid consolidation was noticed in various portions of the lung, with evidences of softening later, at different points. At time of writing, the percussion note in the left apex is rather tympanitic; dull over the lower edge of the pectoralis major. The respiration at the apex is rather tubular, and over the region of dulness numerous moist râles are heard where at first bronchial breathing was noticed. In the left back respiration is rather bronchial in the upper portion and numerous coarse and fine râles are heard throughout the lower half. Bacilli were found in the sputa soon after his second entrance into the hospital. The temperature has been constantly elevated and the pulse rapid. Marked and increasing loss of flesh and strength.

Three intra-pulmonary injections have been made into the left lung since his last entrance without marked effect: the first early in January, the point of insertion being in the second intercostal space, corre-

sponding to those made on the right side; the second, a few weeks later, in the fourth interspace, about in the anterior axillary line, and the third only four days ago, in the second interspace again, where signs of softening and cavity formation had begun. No marked change was noticed in the physical signs in the left lung after any one of the injections. A slight diminution of the cough and sputa was noticed after the first and third operations, and since the last the patient has felt better, but the general signs are those of a steadily increasing pulmonary tuberculosis. No inconvenience was experienced by the injection at any time. The signs in the right lung have remained unchanged until lately, when crumpling has been noticed in the middle of the right back.

Case 2. J. J. C., man; twenty-six; single; clerk in Boston. Entered hospital November 9, 1888, during my service.

Father died of phthisis at seventy-two. Mother of "liver complaint." Habits good. No venereal, malarial, or rheumatic history. Never ill until three months ago, at which time he took cold when down the harbor, and since then has had constant and distressing cough with mucopurulent expectoration, occasionally bloody. Rapid loss of flesh, and night sweats. Hæmorrhage two weeks before entrance. No appetite. No sleep owing to cough. Bowels regular. Micturition normal. Pulse 110; temp. 101° (P.M.). Examination showed marked emaciation, and general characteristics of advanced phthisis. Per-

cussion revealed decided dulness in the upper right chest down to third rib; less marked, but noticeable, below this level. Down to third rib respiration was bronchial and amphoric, with numerous coarse bubbling râles; below, with a sharp line of demarcation between the two regions, coarse moist râles throughout right front were heard.

Dulness in upper half of right back with moist râles throughout. In the upper portion breathing was rather obscure. Questionable râles heard in left back between spine and angle of scapula. No other special abnormalities could be found. Patient was ordered extra diet, a cough syrup, the compound syrup of hypophosphites and whisky ℥ss t.i.d.

November 15. Losing ground. Complains of almost entire loss of sleep from cough and purulent sputa. I decided that it was a case in which an intra-pulmonary injection might be of use and it was done, the point of puncture being in the right second intercostal space, half-way between the mammillary and anterior axillary lines. Iodine was instantly detected in the breath; and for some time a severe fit of coughing with copious expectoration followed, not relieved by the inhalation of a few drops of chloroform or by a hypodermic injection of morphine. One hour later the pulse was very feeble and rapid and I feared the patient might succumb, but after giving tincture of digitalis and brandy he became very comfortable.

November 16. Patient passed the most comfortable night for weeks, sleeping soundly with scarcely

any cough, etc., with markedly diminished expectoration. Looked and felt better than at any time since entrance. Took nourishment well. To my great surprise and pleasure, the moist bubbling râles noticed in the right upper chest before the operation had almost entirely disappeared and were replaced by a faint amphoric respiration. Below, the râles were markedly diminished in number. No special change in the back. The result was corroborated by my house officer, Dr. Gaffney, and by Dr. Bullard who had also previously examined the patient.

A small abscess near the anus was found and opened and about ℥iss of fetid pus was discharged.

From this date up to November 22 the patient was very much more comfortable; slept well and the cough markedly decreased. The percussion note in the right apex on the third day after the injection became high-pitched and tympanitic instead of dull as before, and the dry, amphoric respiration continued at this point. Below, front and back, the moist râles persisted, varying slightly from day to day.

On November 22 the cough had increased again and a few moist râles were again heard in the right apex; the respiration in the upper right back was rather amphoric.

The patient about this time was taken from the ward and put into a private room and given all the nourishing food possible. The pulse continued very rapid and the temperature high. Examination of the sputa for bacilli gave a negative result.

A second injection was made in the same spot, a hypodermic injection of 5 minims of a 5% solution of cocaine having been previously given at the suggestion of Dr. Monks, over the point of puncture. No special pain was experienced, and scarcely any cough followed.

The next day the patient complained of a constant taste of iodine, but was comfortable in other respects, although evidently failing. The sounds in the right apex were rather drier than before the operation. Elsewhere no special change noticed. After this the patient grew steadily weaker but suffered little from cough or otherwise, and died quietly December 3, 1888, three and a half weeks after entrance and nearly three weeks after the first operation.

Unfortunately, no autopsy was allowed by the friends.

Synopsis of first case. Man, aged twenty-four, with phthisical family history, suffering with an acute phthisical process in right lung; severe cough, fetid expectoration, increasing emaciation and loss of strength. Immediate improvement in all the symptoms after one intra-pulmonary injection in the right apex, the same phenomena occurring after three subsequent injections in an interval of three months. Complete arrest of disease and renewal of health for four months. Sudden appearance of tubercular disease in left lung at the end of this time. No apparent relief from three injections into left lung. Rapid failure up to present time.

Synopsis of second case. Man, twenty-six.

Acute and far-advanced case of phthisis. Evidence of large cavity at apex of right lung, with general infiltration below. Very great relief from severe cough and expectoration by two injections into the right apex at an interval of a week. Marked change in the physical signs at the point of injection within a few hours after operation. Death three and one-half weeks after entrance.

What have we learned from these two cases? In the first, I do not think there is a shadow of a doubt in the mind of any of those who saw the case that the injections were the chief cause of the arrest of the disease during the patient's first stay in the hospital last year. The almost immediate disappearance of the most distressing symptoms and the equally apparent improvement in the general condition after each of the four injections, were quite sufficient to have convinced the most sceptical as to the efficacy of the treatment at first, even though, four months later, disease appeared in the other lung, and the same treatment seemed to fail in the desired effect. The question arises as to how far this result could have been prevented had the patient not led a dissipated life for two or three weeks previous to his second illness, and had he lived away from Boston in the open air instead of being confined in the close, vitiated atmosphere of a hotel restaurant in the city. No one, of course, can say, but from experience we are justified in thinking that under proper conditions a recurrence of the disease possibly might not have occurred.

As to the second case: the extraordinary change in the physical signs shortly after the operation, showing a drier condition of the cavity in the right lung, and the marked relief from the most harassing cough and loss of sleep, were such that in any similar case I should most unhesitatingly advise the same treatment, even had I no hope of a permanent cure.

That intra-pulmonary injections would be of use in any or every case it would be folly to presume, but the comparative ease of the operation should encourage us to resort to this method without fear, in what seem to be appropriate cases.